



Spectral Gamma-Ray Borehole  
Log Data Report

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Borehole

41-09-04

Log Event A

### Borehole Information

Farm : <u>SX</u>	Tank : <u>SX-109</u>	Site Number : <u>299-W23-105</u>
N-Coord : <u>35,317</u>	W-Coord : <u>75,833</u>	TOC Elevation : <u>661.56</u>
Water Level, ft :	Date Drilled : <u>3/21/1962</u>	

### Casing Record

Type : <u>Steel-welded</u>	Thickness : <u>0.280</u>	ID, in. : <u>6</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>105</u>	

### Equipment Information

Logging System : <u>2</u>	Detector Type : <u>HPGe</u>	Detector Efficiency: <u>35.0 %</u>
Calibration Date : <u>03/1995</u>	Calibration Reference : <u>GJPO-HAN-1</u>	

### Logging Information

Log Run Number : <u>1</u>	Log Run Date : <u>6/16/1995</u>	Logging Engineer: <u>Dave Traub</u>
Start Depth, ft.: <u>0.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>57.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

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**Analysis Information**

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Analyst : P.D. HenwoodData Processing Reference : Data Analysis Manual Ver. 1Analysis Date : 10/19/1995**Analysis Notes :**

This borehole was logged in one run. The pre- and post-survey field verification spectra showed consistent activities, indicating the logging system operated properly during data collection. Energy calibrations differed because of gain drift in the instrumentation. Gain drifts during data collection necessitated energy versus channel number recalibrations during processing of the data to maintain proper peak identification. No depth overlaps occurred in this borehole, because logging was completed in one run.

A casing-correction factor was applied for a casing thickness of 1/4 (0.25) inches.

Because of a high count rate, the interval from 1 to 3 ft was logged using 25-second real time; this change resulted in live-time measurements of 10 to 17 seconds.

No data were collected below 57 ft, where excessive dead time was expected to occur based on historical log data. WHC personnel did not recommend further logging in the borehole because of past experience with contamination of logging equipment. Cs-137 was measured at about 609 pCi/g, and the total gamma count rate was measured at about 107,000 counts per second at 57 ft in depth. This depth contained the maximum measured concentration, although if the zone of high dead time were to be assayed, it would show much higher values.

The U-238 (609 keV) energy peak data could not be quantified at some locations in the borehole, because the influence of an elevated Compton background caused the 609-keV peak to be indistinguishable. The 1764-keV energy-peak data were used to derive the U-238 concentrations.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Report for tank SX-109.

**Log Plot Notes:**

Three log plots are provided. The Cs-137 concentrations are provided in a separate log plot to document the relative concentrations and shape of the distribution. A plot of naturally occurring radionuclides (K-40, U-238, and Th-232) is also provided, which can be used for lithology interpretation. A combination plot includes logs of Cs-137, natural gamma, total gamma derived from the spectral data, and the latest available data from the WHC Tank Farms gross gamma logging. The energy peaks from which the radionuclide concentrations were derived are included in the headings for the Cs-137 and natural gamma plots.

Log scales were selected for Cs-137, total gamma, and gross gamma logs in order to show the high-intensity peaks. The natural gamma logs are plotted on a linear scale.

The statistical uncertainty in a measurement is represented by error bars on the log plots where appropriate. This uncertainty is reported at the 95-percent confidence interval. The minimum detectable activity (MDA) is represented as an open circle on the plots. The MDA of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible. If the reported concentration is

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slightly above the MDA, the 95-percent confidence interval may extend below the MDA value and detection is not assured with 95-percent certainty.

The Tank Farms gross gamma plot is the latest available from WHC before further logging was barred in this borehole in 1981. A Geiger-Mueller probe (Red probe) was used to log the borehole instead of the more efficient NaI system, because the higher efficiency system experienced excessive dead time through the high-concentration zone. With the exception of scale changes, no attempt has been made to adjust for depth discrepancies or other potential problems.